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Experiment

Hydrodynamic instability experiments in the solid state* - D.H. Kalantar, B.A. Remington, K.S. Budil, G.W. Collins, J.D. Colvin, S.V. Weber, D. Griswold, R. Lee, *LLNL*, A. Hauer, *LANL*, J.S. Wark, *University of Oxford* - We are developing experiments on the Nova laser to investigate the Rayleigh-Taylor (RT) instability in metal foils maintained in the solid state. We use a high contrast shaped 6.5 ns laser pulse to generate an x-ray drive with a foot temperature of ~30 eV and a peak temperature of 90-100 eV. We use a CH(Br) ablator and launch a series of shocks into 15 **m**m thick Cu and Mo foils with a sinusoidal amplitude modulation on the surface at the embedded interface. This compresses the foil by a factor of 1.5-2.0 at a pressure of 3-5 Mbar, and a temperature near the melt temperature. We observe RT instability growth that is delayed from classical (fluid case) by several nanoseconds, suggesting that the metal foil remains in the solid state, and that the RT growth in the solid state is much lower than in the fluid state. We are developing dynamic Bragg diffraction techniques[1] to demonstrate that the foils remain solid. We present results from Nova experiments of RT instability growth and Bragg diffraction.

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[1]R.R. Whitlock and J.S. Wark, Phys. Rev. B **52**, 8 (1995); J.S. Wark et al., J. Appl. Phys. **68,** 4531 (1990); Phys. Rev. B **40**, 5705 (1989)

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